The Taxation of Couples

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Abstract

This paper provides a survey of the economic analysis, much of it quite recent, concerned with the analytical issues raised by the question of how couples - two-adult households - should be taxed. It concludes that much more needs to be known about the empirical relationship between productivity in household production and female labour supply.

1 Introduction

This paper discusses the implications, for tax policy and for the theory of taxation, of the fact that households typically consist of couples[1]. These issues of theory and policy are of course closely related. Ideally, the theory of optimal taxation and tax reform would provide the analytical basis for the discussion of policy. An assessment of the extent to which it does so will be a prime objective of this paper.

In the tax policy-oriented public finance literature up to the late 1970's, the central issue was seen to be the problem of taxation of couples versus singles, and the avoidance of a tax bias in favour of or against getting married.[2] Horizontal equity was seen to require a lower tax burden on a couple than on a single individual with the same income, since more people had to be supported by the income in the former case. Much emphasis was placed

[1]With or without children. In general we subsume child care under the heading of "household production".

[2]See for example Pechman (1973), (1978).

on the fact that the goals of progressivity in the rate structure[3], horizontal equity in treating households with the same total income, and the avoidance of a tax bias in the marriage decision, were mutually inconsistent. The implicit picture of the two-person household was clearly one in which there was a complete division of labour between partners, with one specialising entirely in labour supply to the market, the other in producing goods and services within the home.

Given this picture of the household, the model underlying the revolutionary new analysis of optimal income taxation, inaugurated by Mirrlees (1971), and Sheshinski (1972), which took the decision unit as a single individual dividing his time between market work and leisure,[4] did not seem out of place. Even then, however, the spectacular growth in female labour force participation that had been taking place in virtually all developed countries since the early 1950's was calling this picture into question, and presenting a new issue for tax policy: How to tax two-earner couples.

The policy choice was perceived as being from one of three systems:

joint taxation, in which the partners' incomes are added together and taxed at progressive marginal rates as if they had each earned one-half the income. This implies equality of marginal tax rates on partner incomes, or, as it was then expressed, that the tax rate on the last dollar of the husband's income was applied to the first dollar of the wife's;

individual taxation, in which each partner's income is taxed separately, but according to the same progressive tax schedule;

selective taxation, in which secondary earners are taxed on a separate, lower, progressive tax schedule than that for primary earners.

The main contributors to the debate in the US, Munnell (1980) and Rosen (1976), argued for a change in the US tax system from joint taxation to individual taxation. They based the argument primarily on the empirical evidence that female labour supply elasticities were higher than those of males, and so standard excess burden-minimisation arguments would imply different tax rates. The logical conclusion of this would in fact seem to be selective taxation, but this perhaps was to them a step too far. This argument also ignores distributional issues. In any event, the US tax system still is one

[3] By which we will mean in this paper an average tax rate increasing with income.

[4] There are conditions under which this model can also be interpreted as one in which a two-person household can be aggregated and treated as an individual. For further discussion see Apps (2003).

of joint taxation, as is that of Germany.[5]

On the other hand, official reports were published in countries such as the UK, Canada and Australia,[6] that were entirely pragmatic, and concerned primarily with equity issues. Nonetheless, they lead to the replacement of joint by individual taxation in those countries. The central issue was viewed as the status of women, and, implicitly, the distribution of welfare within the household, though the disincentive effects of high marginal tax rates on low female incomes were also acknowledged. Joint taxation was a perpetuation of the situation in which a wife is an appendage to her husband, rather than a separate individual. Ending it was a step in the direction of giving women equal rights. The change was driven not by economists, but by lawyers, who were concerned with the legal rights of women as individuals in a whole range of areas. Because they saw the issue as one of rights, *i.e.* of equity, rather than of efficiency, for them the move to individual taxation was a sufficient remedy. There were however weaknesses in their perception of the economic issues, not only in relation to labour supply elasticities, but also to the equity implications of the heterogeneity across households associated with household production.

A striking empirical fact, as valid now as it was then, is the variation in female labour supply across households. This variation is still strongly significant after controlling for wage rates and demographic factors, such as family size, and has not been explained in the empirical labour economics literature. It has the implication that different tax systems lead to very different distributions of tax burdens across households. Income splitting strongly favours single earner couples, a move to individual taxation leads to a substantial shift of burdens from households with higher to those with lower female labour supplies. Though attention has been focussed on how income splitting equalises male and female marginal tax rates, it is not usually noticed that having a working wife in a joint tax system also raises a man's marginal tax rate above that of a man with a non-working wife and the same earnings. To evaluate the welfare implications of these sorts of considerations, we need to know how the factors determining the labour supply decision are related to the utility possibilities of the household. To answer the question, "is the household with high female labour supply better off

[5] In France, income splitting is carried one step further, in that aggregate income is divided by the total number of family members before a tax rate is applied.

[6] See for example HMSO (1980), The Canadian Royal Commission on Taxation (1966), and the Australian Tax Review Committee (1975).

than the household in which the wife works at home, and should it be taxed more?" we need an hypothesis that explains the differences in labour supply, or, equivalently, time spent in household production.

In the US discussion, Munnell, in particular, clearly recognised that any discussion of equity in the tax treatment of two-person households cannot ignore household production. Take as an example a situation in which a household with two full-time earners has the same total income as a household in which only one partner works in the market. The argument against applying the same tax rate to the two households is that the latter household may have a much higher *full income*, defined as the sum of market income and the value of household production. That is, market income may be a poor proxy for full income, which is the more appropriate indicator of the utility possibilities of the household. A more pragmatic, but less satisfactory, way of putting this is to say that the former household will have to spend more of its market income on buying in substitutes for domestic production, such as child care, meals, laundry and house-cleaning services, and so on. Thus it is hard to regard the two households as equally well off. This example puts in a simple but stark way the issue presented by the huge variation in female labour supply across households.

The problem is that Munnell's insights were not integrated into a formal economic model of taxation, at least not until quite recently. The issue is that of how variations in male and female wage rates interact with variations in household productivity to determine what income tax rates should be, given the standard normative framework of modern public finance theory, and the constraint that only observed market labour incomes can be taxed.[7] The remainder of this paper goes on to consider approaches to this question. We begin with the model of Boskin and Sheshinski (1983), which is generally regarded as having established the conventional wisdom in this area, namely that selective, and not joint, or even independent, taxation is optimal.[8]

[7]This intentionally excludes the possibility of using indirect taxation, for example of market inputs into household production, to tax what is here taken to be non-taxable, the consumption of domestic goods. This does not seem to us to be as pressing a policy concern as that of income taxation of couples. For work on the issue of indirect taxation, see...

[8]This conventional wisdom has been challenged, in our view unsuccessfully, by Piggott and Whalley (1996) and Kleven (2002), who claim to establish grounds for joint taxation.

2 The Boskin-Sheshinski Model

This model, based on the optimal linear income tax analysis of Sheshinski (1972), could be viewed as making the smallest possible extension to the model of the individual worker/consumer just necessary to analyse taxation of two-person households. Its main result is to make precise the intuition that selective taxation is optimal because the elasticity of female labour supply is higher than that of male labour supply.

A household has the utility function $u(y, l_f, l_m)$, where y is a market consumption good, and $l_i \geq 0$, $i = f, m$, is the labour supply of household member[9] i. The household faces the budget constraint

$$y = a + \sum_{i=f,m} (1 - t_i)x_i$$

where a is the lump sum in a linear tax system and t_i is the marginal tax rate on $i's$ gross income $x_i \equiv w_i l_i$, with w_i the exogenously given market wage. Thus a household is characterised by a pair of wage rates (w_f, w_m), otherwise households are identical. Since this is a linear tax problem we do not have to assume that a household's wage pair is observable.[10] There is a given population joint density function $f(w_f, w_m)$, everywhere positive on $\Omega = [w_f^0, w_f^1] \otimes [w_m^0, w_m^1] \subset \mathbf{R}_+^2$, which tells us how households are distributed according to the innate productivities in market work of their members, as measured by their market wage rates.

To focus attention on what we regard as the most important aspects of the results, we assume that the household utility function[11] takes the quasilinear form

$$u = y - u_f(l_f) - u_m(l_m) \quad u_i' > 0, u_i'' > 0$$

which, however, we find more convenient to write in terms of gross incomes

$$u = y - v_f(x_f) - v_m(x_m) \quad v_i' = u_i'/w_i, v_i'' = u_i''/w_i^2$$

Solving the household's utility maximisation problem yields demands $y(a, t_f, t_m)$,

[9] Although it could just as well be thought of as referring to a single individual with two sorts of labour supply or leisure.

[10] The question of optimal nonlinear taxation is discussed below.

[11] Clearly the model can say nothing about the within-household welfare distribution. This is discussed more fully below.

$x_i(t_i)$ and the indirect utility function $v(a, t_f, t_m)$ such that

$$\frac{\partial v}{\partial a} = 1; \; \frac{\partial v}{\partial t_i} = -x_i \; \frac{\partial v}{\partial w_i} = (1 - t_i) l_i$$

Note that

$$x_i^{'}(t_i) = w_i \frac{dl_i}{dt_i}$$

is a compensated derivative, because of the absence of income effects. For the same reason, it is straightforward to confirm that labour supplies and gross incomes are strictly increasing in the wage rate and decreasing in the tax rate. Thus household utility is strictly increasing in household income. Note that the choice of utility function sets the effects of one partner's wage on the labour supply of the other to zero. This makes it much easier to derive the main insights of the analysis without doing too much injustice to the facts.[12]

To find the optimal tax system we introduce the social welfare function $W(.)$, which is strictly increasing, strictly concave and differentiable in the utility of every household, and the planner's problem is then

$$\max_{a, t_f, t_m} \iint_{\Omega} W[v(a, t_f, t_m)] f(w_f, w_m) dw_f dw_m$$

subject to the tax revenue constraint

$$\iint_{\Omega} [t_f x_f + t_m x_m] f(w_f, w_m) dw_f dw_m - a - G \geq 0$$

where $G \geq 0$ is a per household revenue requirement. The first order condition with respect to the lump sum a can be written

$$\iint_{\Omega} \frac{W'}{\lambda} f(w_f, w_m) dw_f dw_m = 1$$

where $\lambda > 0$ is the marginal social cost of tax revenue and $W^{'}/\lambda$ the marginal social utility of income to a household with characteristic (w_f, w_m). Thus

[12] Empirical evidence seems to sugest no significant effects of a wife's wage on husband's labour supply and only very weak negative effects of husband's wage on wife's labour supply.

the optimal a equates the average marginal social utility of income to the marginal cost of the lump sum. We denote a household's marginal social utility of income W'/λ by s, and its mean by $\bar{s}$. Thus the condition sets $\bar{s} = 1$. Because of the assumptions on $W(.)$, households with relatively low wage pairs will have values of s above the average, those with relatively high wage pairs, below.

The first order conditions on the marginal tax rates, using the above condition, can be written as

$$t_i^* = \frac{Cov[s, x_i]}{\bar{x}_i^{'}} \quad i = f, m$$

where

$$Cov[s, x_i] = \iint\limits_{\Omega} (\frac{W'}{\lambda} - 1) x_i f(w_f, w_m) dw_f dw_m$$

is the covariance of the marginal social utility of household income and the gross household income of individual i, and

$$\bar{x}_i^{'} = \iint\limits_{\Omega} x_i^{'}(t_i^*) f(w_f, w_m) dw_f dw_m$$

is the average compensated derivative of gross income with respect to the tax rate, and is negative.

Now the argument that $t_f^* < t_m^*$ is based on the empirical evidence suggesting that $-\bar{x}_f^{'} > -\bar{x}_m^{'}$, but this clearly considers only part of the optimal tax formula, and is in general neither necessary nor sufficient for the result. In other words, though taxing women at a given rate creates a higher average deadweight loss than taxing men at the same rate, the policy maker's willingness to trade off efficiency for equity might imply that the tax rate on women could optimally be higher than that on men, if the covariance between the marginal social utility of household income and women's gross income is in absolute value sufficiently higher than that of men, so that the corresponding redistributive effects make that worthwhile. But these redistributive effects have received virtually no attention, either in Boskin-Sheshinski or in the earlier, less formal treatments of the subject[13]. It is certainly true that

[13] The standard textbook treatments pf optimal linear taxation, as for example in Atkinson and Stiglitz (1980), Myles (1995) and Salanié (2002), could be interpreted as assuming

equality of the marginal tax rates appears as a highly special case, and so joint taxation is very unlikely to be optimal, but the results of this model so far do not make a conclusive case for taxing women at a lower rate than men, as the conventional wisdom assumes. The optimal tax analysis suggests a departure from income splitting, but it does not tell us much about the appropriate direction of this departure. In fact, the analysis is unnecessary to give us the basic result, since joint taxation amounts to imposing on the optimal tax problem the constraint that the marginal tax rates be equal, and such a constraint cannot increase the value of the objective function at the optimum.

To make this a little more precise, write

$$Cov[s, x_i] = \rho_i \sigma_i \sigma_s \quad i = f, m$$

with ρ_i the correlation coefficient between s and x_i, σ_i the standard deviation of x_i, and σ_s the standard deviation of s. Then we have

Proposition 1:

$$t_f^* < t_m^* \Leftrightarrow \frac{\rho_f \sigma_f}{\rho_m \sigma_m} < \frac{\bar{x}_f^{'}}{\bar{x}_m^{'}}$$

It is an open question empirically, whether this condition is satisfied.

An important limitation of the Boskin-Sheshinski model, as our discussion in the introduction suggests, is that it omits household production. Why should this matter? After all, it could be argued, all that is really important are the labour supply (gross income) derivatives and the covariance of gross income with the marginal social utility of household income. Whether substitution at the margin is between market work and leisure, or market work and household production, is, on this argument, just a matter of detail that does not really have substantive implications.[14]

What makes this argument untenable is the enormous variation across households in female labour supply discussed earlier, and the implication that gross income need not correctly reflect utility possibilities. In the Boskin-Sheshinski model, the household's utility possibilities necessarily increase

complete specialisation, so that $x_f = 0$, and that women contribute a constant term to the household's utility, from a constant amount of household production or leisure. In that case $t_f^* = 0$ and the distributional term in the male tax rate depends only on the variation in male utility.

[14] This seems to be the view of many econometricians working in the labour supply and tax policy area, see for example Blundell and McCurdy (1999).

with household market income, which is therefore an appropriate welfare measure for purposes of income taxation. A central consequence of taking account of household production, in a way that also explains the empirical evidence on female labour supply, is that household income may be a poor, and possibly negative, indicator of household welfare, which in turn should have important policy implications. We now set up a simple household model incorporating household production, and use it to explore issues in the taxation of couples, beginning with an extension of the optimal linear taxation model.

3 The Household Production Model

We introduce domestic goods z_i produced by $i = f, m$, with each being consumed by both members of the household, and write the household utility function now as

$$u = y + \phi(z_f) + \mu(z_m)$$

The household good z_f is produced according to the production function

$$z_f = kh_f$$

where the productivity parameter $k \in [k_0, k_1] \subset \mathbf{R}_+$ *varies across households*, and h_f is the time f spends in domestic production. We assume that males in all households are equally productive in household production, because we want to take the primary effect of productivity variation across households to be on female labour supply. By choice of units, we can therefore set the time spent by m in household production, $h_m = z_m$. The implicit price, p, of the domestic good z_f, is equal to its marginal cost, given by

$$p = \frac{(1 - t_f)w_f}{k}$$

and so

$$\frac{\partial p}{\partial t_f} = \frac{-w_f}{k}$$

The price of z_m is $q = (1 - t_m)w_m$. The individuals have time constraints

$$l_i + h_i = 1 \quad i = f, m$$

where total time is normalised at 1. The household budget constraint is

$$y = a + (1 - t_f)w_f l_f + (1 - t_m)w_m l_m$$

which, using the time constraints, can be written as

$$y + pz_f + qz_m = Y$$

where $Y \equiv a+(1-t_f)w_f+(1-t_m)w_m$ is the household's *net full income*. From this budget constraint it is clear that two households with identical male and female wage rates and differing values of k will have differing utility possibilities, with the household with the lower value of p, *i.e.* the higher female productivity in domestic production, having the higher budget constraint.

This is made explicit if we solve the household's utility maximisation problem to obtain the demand functions $y(p, q, Y)$, $z_f(p)$, $z_m(q)$ and its indirect utility function $v(p, q, Y)$, with

$$\frac{\partial v}{\partial p} = -z_f; \quad \frac{\partial v}{\partial q} = -z_m; \quad \frac{\partial v}{\partial Y} = 1$$

Then obviously the higher the value of k and therefore (for equal female wage rate) the lower is p, the higher the household's utility. For the interpretation of the tax analysis it is also useful to note that

$$\frac{\partial v}{\partial a} = 1; \quad \frac{\partial v}{\partial t_i} = -w_i l_i \quad i = f, m$$

Of key importance is the relation between female market labour supply, and therefore household market labour income, and the productivity parameter k. Unfortunately, this is in general ambiguous. Thus we have

$$l_f = 1 - \frac{z_f(p)}{k}$$

and so

$$\frac{\partial l_f}{\partial k} = \frac{z_f}{k^2} - \frac{z_f^{'}(p)}{k}\frac{\partial p}{\partial k}$$

The first term is positive, and reflects the effect of increasing productivity in reducing the time required to produce a given domestic output. The second term is negative, since demand for domestic output increases as its price falls, and increasing k reduces the price of the domestic good. Thus increasing productivity reduces the time needed to produce a given level of domestic output but increases the demand for it, so the net outcome depends on the relative strength of these two effects. Noting that $\frac{\partial p}{\partial k} = -\frac{p}{k}$, we can write this as

$$\frac{\partial l_f}{\partial k} = \frac{z_f}{k^2}(1-e)$$

where e is the price elasticity of demand of the domestic good. Thus if this demand is elastic ($e > 1$), female labour supply decreases with productivity, while it increases in the converse case. Moreover, we can derive a very simple relationship between the elasticity of female labour supply with respect to the net wage, e_{w_f}, and this elasticity of demand for the domestic good, which is

$$e = e_{w_f} \frac{l_f}{h_f}$$

Thus if we know a household's female labour supply elasticity and the raio of market to domestic labour supply, we can predict how variations in its domestic productivity affect female labour supply.

4 Optimal Linear Taxation

Turning now to the optimal linear tax analysis, we extend the Boskin-Sheshinski model in the simplest possible way. First, we adopt their assumption of *assortative matching*, in the sense that across households, the female wage rate is an increasing function of the male, which we take in the linear form

$$w_f = \alpha w_m \quad \alpha \in (0,1)$$

Because of this we from now on write the male wage simply as $w \in [w_0, w_1] \subset \mathbf{R}_+$. We also assume we have the joint density function $f(k, w)$ defined on $\Delta = [k_0, k_1] \bigotimes [w_0, w_1] \subset \mathbf{R}^2_+$. A value of the male wage w corresponds now to a pair of wage rates. We set up essentially the same optimal tax problem as before

$$\max_{a,t_f,t_m} \iint\limits_{\Delta} W[v(a, t_f, t_m)] f(k, w) dk dw$$

subject to the revenue constraint

$$\iint\limits_{\Delta} [t_f \alpha l_f + t_m l_m] w f(k, w) dk dw - a - G \geq 0$$

To facilitate comparison with the earlier analysis we can write

$$\begin{aligned} x_f &= \alpha w l_f; \;\; x_m = w l_m \\ x_f^{'} &= \alpha w \frac{\partial l_f}{\partial t_f}; \;\; x_m^{'} = w \frac{\partial l_m}{\partial t_m} \end{aligned}$$

The first order condition with respect to the lump sum a can be written as

$$\iint\limits_{\Delta} \frac{W^{'}}{\lambda} f(k,w) dk dw = 1$$

and so, again denoting the marginal social utility of income to a household by s, we have its expected value $\bar{s} = 1$. The condition with respect to the i'th tax rate can be written as

$$t_i^{*} = \frac{Cov[s, x_i]}{\bar{x}_i^{'}} \quad i = f, m$$

with now

$$\begin{aligned} Cov[s, x_i] &= \iint\limits_{\Delta} (\frac{W^{'}}{\lambda} - 1) x_i f(k,w) dk dw \\ \bar{x}_i^{'} &= \iint\limits_{\Delta} x_i^{'} f(k,w) dk dw \end{aligned}$$

Superficially, the results look very similar to those derived in the Boskin-Sheshinski model. While however the denominator terms have the same meanings as before, in fact there are crucial differences, essentially to do with the distributional terms in the numerators.[15] The male tax rate is unaffected by the introduction of household production, because x_m does not vary with k. However, the value of $Cov[s, x_f]$ now depends crucially on the way in which female labour supply, and hence x_f, varies with k. If x_f is increasing with k, this covariance is certainly negative and will be higher than that of male workers, thus raising the possibility that the female optimal linear tax rate will be higher than the male, essentially because it is a more powerful instrument for redistributing income and utility from better off to

[15] This does tell us that introduction of household production is not essential as long as our only concern is with deadweight loss, *i.e.* efficiency rather than equity.

worse off households. On the other hand, if x_f is decreasing with k, then this covariance will be lower in absolute value than that for males, and may even be positive, implying a negative tax rate on women. In this (admittedly somewhat extreme) case, female gross income is a negative indicator of household welfare, and so, for a given lump sum a, the male tax rate will be correspondingly higher, thus redistributing income from households with higher wages and lower female labour supply to households with lower wages and higher female labour supply. The latter are in fact, in utility terms, worse off, even if their aggregate gross income may be higher. Note finally that, in the case where both tax rates are positive, but female labour supply varies inversely with domestic productivity, there could be a great deal of vertical inequity in the tax system, essentially because the female income tax rate captures the effects of variation in domestic productivity only very imperfectly. Take two households with the same wage rates and therefore male gross incomes. The household with the lower female gross income, and therefore smaller total tax bill, will actually have the higher pre-tax utility level. The importance of such inequities obviously depends on the strength of the relation between domestic productivity and female labour supply, about which nothing is known empirically.

5 Tax Reform

The optimal tax analysis can provide important insights, but from the point of view of actual tax policy, an analysis of tax reform, *i.e.* the search for welfare improving directions of change from an initial non-optimal position, is more relevant. In this section we consider two examples of tax reform problems,[16] using them again to highlight the central importance of the relation between female labour supply and productivity in household production in determining the conclusions.

5.1 The Flat Rate Case

We use the model of the previous section to analyse a tax reform consisting of a (local) revenue neutral movement away from a position where all households face the same tax rate, i.e. we initially have a flat rate tax system. We shall

[16] We draw heavily here on Apps and Rees (1999), to which the reader is referred for motivation and analysis of a wider range of cases.

relax this assumption below, but for the moment it is useful to highlight certain aspects of the results. Thus the marginal tax rates t_f and t_m are equal initially, and we consider differentials $dt_f < 0 < dt_m$ which, because of revenue neutrality, have to satisfy

$$dt_f = -\beta dt_m$$

where

$$\beta = \frac{\iint\limits_{\Delta} [x_m + t_m x_m^{'}] f(k,w) dk dw}{\iint\limits_{\Delta} [x_f + t_f x_f^{'}] f(k,w) dk dw} = \frac{\bar{x}_m + t_m \bar{x}_m^{'}}{\bar{x}_f + t_f \bar{x}_f^{'}}$$

Since we assume both $\bar{x}_f < \bar{x}_m$ and $\bar{x}_f^{'} < \bar{x}_m^{'} < 0$ we will have $\beta > 1$. Any one household is made better off by this reform if and only if

$$dv = (\beta x_f - x_m) dt_m > 0$$

i.e. iff

$$\beta > \frac{x_m}{x_f}$$

Thus a household is more likely to be made better off the lower its ratio of gross male to gross female income, and it is straightforward to show that *all* households *could* be better off, and at least *some* households *must* be. For the latter, we have

Proposition 2: *For the given tax reform, on the assumptions* $\bar{x}_f < \bar{x}_m$ *and* $\bar{x}_f^{'} < \bar{x}_m^{'} < 0$ *at least some households are made better off.*

Proof: Suppose to the contrary that all households are made worse off. Then we must have for all households

$$\begin{aligned} \beta &< \frac{x_m}{x_f} \\ &\Rightarrow \beta < \frac{\bar{x}_m}{\bar{x}_f} \\ &\Rightarrow \frac{\bar{x}_m^{'}}{\bar{x}_f^{'}} > \frac{\bar{x}_m}{\bar{x}_f} \end{aligned}$$

which contradicts the assumptions.

It is possible to construct special cases in which the condition is satisfied for all households, but it has to be accepted that empirically, since x_f may be zero for some households, we should expect some households would be made worse off. Again, however, the welfare effects depend on the relationship between household productivity and female labour supply, since this determines whether the households which may be made worse off by this reform, the ones with a sufficiently high ratio $\frac{x_m}{x_f}$, are in fact higher or lower in the initial welfare distribution.

5.2 A Progressive Joint Tax System

Suppose we start with a tax system in which there is income splitting, and the marginal tax rate increases with joint household income. We want to consider the desirability of progressive income taxation in this context. To simplify, we assume that there are just two household types, $h = 1, 2$, distinguished by different values of household productivity k_h. Also, we take initially the case in which everyone, both male and female, has the same market wage, w. Thus the differences in female labour supply are due entirely to differences in domestic productivity, as are the differences in household pre-tax utility possibilities. Both men will have the same labour supplies and gross incomes x_m, and we assume that household 2 has the higher female labour supply and gross income, $x_{f2} > x_{f1}$. Each household receives the same lump sum, a, but household h pays a marginal tax rate t_h, with $t_2 > t_1$. There are n_h households of type h. The government revenue constraint is now

$$\sum_{h=1}^{2} n_h[t_h \sum_{i=f,m} x_{ih} - a] - R \geq 0$$

where $R \geq 0$ is an aggregate revenue requirement. We take the social welfare function as having the same general form as that used in the optimal tax analysis, specialised to this simple case:

$$S = \sum_{h=1}^{2} n_h W[v_h(t_h)] \quad W^{'} > 0, W^{''} < 0$$

We consider a tax reform consisting of revenue neutral changes in the tax rates, dt_h. The question of interest is: When is a *reduction* in the progressivity of the tax system social welfare enhancing?

Note first that the tax rate changes must satisfy

$$dt_1 = -\gamma dt_2$$

where

$$\gamma = \frac{n_2 \sum_i (x_{i2} + t_2 x_{i2}^{'})}{n_1 \sum_i (x_{i1} + t_1 x_{i1}^{'})}$$

We then ask, under what condition will the change $dt_2 < 0$ satisfy

$$dS = -\sum_{h=1}^{2} n_h W_h^{'} \sum_{i=f,m} x_{ih} dt_h > 0$$

so that a reduction in progressivity is welfare increasing. This is given by the simple condition

$$\frac{W_2^{'}}{W_1^{'}} > \frac{1 - e_2}{1 - e_1}$$

where

$$e_h \equiv -\frac{t_h}{\sum_i x_{ih}} \sum_i \frac{\partial x_{ih}}{\partial t_h} > 0$$

is an aggregate household elasticity of gross income with respect to the tax rate. Now if these elasticities are equal, a necessary and sufficient condition for a reduction in progressivity is that female labour supply be inversely related to domestic productivity. However, Heckman (1995) argues that the evidence on male and female labour supply elasticities suggests that higher female labour supply elasticities result from the fact that labour supplies are more elastic for individuals, of either gender, who have low labour supply. Thus it may well be the case that household 1 will have a higher elasticity than household 2, in which case the condition becomes more stringent. On the other hand, if $x_{f1} = 0$, and $\frac{\partial x_{f1}}{\partial t_1} = 0$, and the male labour supply elasticities are just equal, then we certainly have $e_2 > e_1$, and overall welfare could be increased even if $W_2^{'} < W_1^{'}$,which could be the case for example if a small difference in domestic productivities leads to a substantial increase in female labour supply.

6 Conclusions

This paper has presented a survey of the economic analysis concerned with the question of how couples should be taxed. One reason for the importance of this issue is simply that the overwhelming majority of households consist of couples, and so it could be argued that empirically, this is the single most important problem in income taxation. A second reason is that the economic theory of optimal taxation and tax reform, at least as it is presented in the major text books, provides little guidance on this issue, resting as it does on models of the single person household. An old insight in the public finance literature is that any discussion of the taxation of two-person households necessarily involves the recognition of the importance of household production. In this paper we have tried to show how a simple model of household production can be used to help the analysis of optimal taxation and tax reform. What emerges clearly from the analysis is how centrally important the relationship between productivity in household production and female labour supply really is, and how little we know we know about it empirically. This suggests an agenda for future empirical research.

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